# Automatic Total Recall System Test Program

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*The Automatic Total Recall System (ATRS) Operational Program provides a very important data retrieval function from the Deep Space Stations to the Mission Control Center. The operational integrity of this program must be verified after any software changes have been made to it or after any hardware modifications have been made at the Deep Space Stations. The ATRS Test Program provides this capability by simulating the ATRS function of the Mission Control Center.*

## I. Introduction

The Deep Space Station (DSS) Telemetry and Command Subsystem (TCD), along with the Ground Communications Facility (GCF), provides a communications link between the spacecraft and the Mission Control Center. The TCD is responsible for transmitting commands to the spacecraft and recovering incoming telemetry data from the spacecraft. The TCD generates a real-time Digital Original Data Record (DODR) of all telemetry and command data transmitted over the communications link between the DSS and the Mission Control Center. If, for any reason, an incomplete data record is received at the Mission Control Center, the DSS can replay the data from the DODR by using the Automatic Total Recall System (ATRS) Operational Program (Ref. 1).

## II. Purpose

The purpose of the ATRS Test Program is to provide an independent on-station means of testing and verifying the ATRS function at the DSS. This task is accomplished by simulating the Mission Control Center ATRS function and performing tests on the response made by the ATRS Operational Program. This effectively eliminates the need for scheduling the Mission Control Center for the development, implementation, and testing of the ATRS function until it is considered operational.

## III. Program Structure

The ATRS Test Program was designed and implemented for use on either the Digital Instrumentation

Subsystem (DIS) or Telemetry and Command Processor (TCP) computers located at the DSSs. The program was designed to be mission-independent and implemented in modularly structured assembly language to facilitate future expansions and modifications. The program resides on magnetic tape and is loaded by means of a paper tape bootstrap loader.

## IV. Functional Description

Under operator control, the ATRS Test Program formats and displays ATRS initialization and recall request blocks and transmits them to the ATRS Operational Program over the high-speed data (HSD) or wide-band data (WBD) communications lines. These blocks contain descriptions of, and requests for, blocks of data from the DODR. Additionally, the ATRS Test Program retains the information from these blocks as a means of testing the ATRS Operational Program's responses.

When the ATRS Operational Program receives both the initialization and recall request blocks, it searches the DODR and plays back the data over the HSD/WBD communications line to the ATRS Test Program. The ATRS Test Program receives these blocks and compares the data block type, the data block time, and the sequencing of the blocks against the reference information. Any discrepancies are noted by the outputting of error messages on the operator-selected input/output device. The ATRS Test Program also has the capabilities of selectively displaying any data block received and writing its own ODR of all data blocks received.

## V. Conclusions

The ATRS Test Program is a very useful tool in that it has helped to automate the implementation and testing of the ATRS function at the DSSs. It also has proved to be very useful in the development of the ATRS operational software due to its ability to simulate the ATRS function of the Mission Control Center.

Figure 1 shows the configuration and interface of the ATRS Operational Program and the ATRS Test Program at the Deep Space Stations.

## Reference

1. Hlavaty, F. M., "Automatic Total Recall Program for Replay of DSN 7-Track DODRs," in *The Deep Space Network Progress Report 42-25*, pp. 137–141, Jet Propulsion Laboratory, Pasadena, Calif., Feb. 15, 1975.

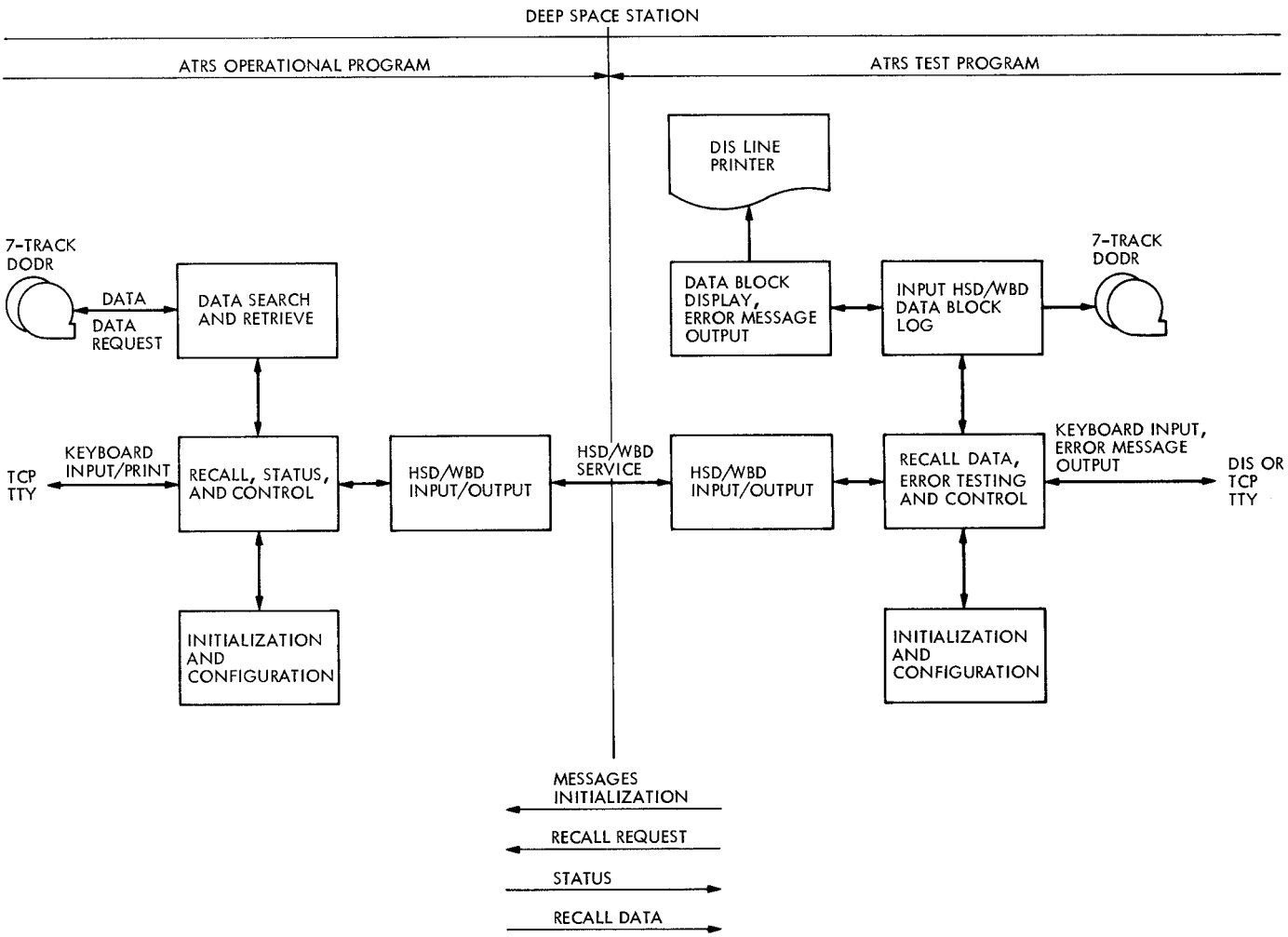


**Fig. 1. Automatic Total Recall System test configuration**